

Name: _____

at1119paper: Complete the Square, $b = \text{odd}$ (v517)

Example

By completing the square, find both solutions to the given equation:

$$x^2 - 53x = -396$$

Add $\left(\frac{-53}{2}\right)^2$, which equals $\frac{2809}{4}$, to both sides of the equation.

$$x^2 - 53x + \frac{2809}{4} = \frac{1225}{4}$$

Factor the left side.

$$\left(x + \frac{-53}{2}\right)^2 = \frac{1225}{4}$$

Undo the squaring.

$$\begin{aligned} x + \frac{-53}{2} &= \frac{-35}{2} \\ x &= \frac{53 - 35}{2} \\ x &= 9 \end{aligned}$$

$$\begin{aligned} \text{or} \\ x &+ \frac{-53}{2} = \frac{35}{2} \\ x &= \frac{53 + 35}{2} \\ x &= 44 \end{aligned}$$

Question 1

By completing the square, find both solutions to the given equation:

$$x^2 + 19x = 1316$$

$$\begin{aligned} x^2 + 19x + \frac{361}{4} &= \frac{5625}{4} \\ \left(x + \frac{19}{2}\right)^2 &= \frac{5625}{4} \end{aligned}$$

$$\begin{aligned} x + \frac{19}{2} &= \frac{-75}{2} \\ x &= \frac{-19 - 75}{2} \\ x &= -47 \end{aligned}$$

$$\begin{aligned} \text{or} \\ x + \frac{19}{2} &= \frac{75}{2} \\ x &= \frac{-19 + 75}{2} \\ x &= 28 \end{aligned}$$

Question 2

By completing the square, find both solutions to the given equation:

$$x^2 + 31x = -234$$

$$x^2 + 31x + \frac{961}{4} = \frac{25}{4}$$

$$\left(x + \frac{31}{2}\right)^2 = \frac{25}{4}$$

$$x + \frac{31}{2} = \frac{-5}{2}$$

or

$$x + \frac{31}{2} = \frac{5}{2}$$

$$x = \frac{-31 - 5}{2}$$

or

$$x = \frac{-31 + 5}{2}$$

$$x = -18$$

or

$$x = -13$$

Question 3

By completing the square, find both solutions to the given equation:

$$x^2 + 7x = 294$$

$$x^2 + 7x + \frac{49}{4} = \frac{1225}{4}$$

$$\left(x + \frac{7}{2}\right)^2 = \frac{1225}{4}$$

$$x + \frac{7}{2} = \frac{-35}{2}$$

or

$$x + \frac{7}{2} = \frac{35}{2}$$

$$x = \frac{-7 - 35}{2}$$

or

$$x = \frac{-7 + 35}{2}$$

$$x = -21$$

or

$$x = 14$$